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## EXPECTED COMET OF 1264 and 1556.

*Extract of a letter from Mr. Hind.*

"I believe I have been misunderstood in reference to the time of reappearance of the comet of 1556. However I may have expressed myself, I never intended to imply that, in my idea, the comet would return exactly at the end of a period of 291·7 years, which is the interval between the perihelion passages in 1264 and 1556. On the contrary, I think I am right in stating that the effect of perturbations by *Saturn* and *Neptune* during the last revolution will tend to retard its appearance, while *Jupiter* will not exercise any serious influence either one way or the other. If the mean motion in 1556 corresponded to the semi-major axis given by the interval between 1264 and 1556, the next return of the comet may very probably be delayed many months, possibly one or two years, beyond the present time. I have now in the press a small work* upon this comet, in which I have collected nearly all that is known of its former history, with ephemerides for the approaching return.

## HIND'S CHANGING STAR.

*Extracts of a Letter from Mr. Hind to the President, dated May 2, respecting the star newly discovered by him in Ophiuchus; with remarks by other astronomers.*

"My acquaintance with the neighbourhood commenced in February; and I am able to state with confidence that, up to April 5, no star so bright as 9·10 magnitude had been noticed in the position of the new one. Yesterday morning I estimated it of the 5th magnitude, or equal to 20 *Ophiuchi*; it hardly appeared so bright as on April 29 A.M., but haze prevailed in many directions and may have partially obscured it. I believe I mentioned in my former letter, that a planetary disc was suspected under high magnifiers, but I am by no means satisfied with the observation. On the contrary Mr. Dawes assures me, that with Mr. Lassell's nine-foot reflector, and powers up to 600, it has nothing planetary in its appearance.

"In the appendix to the *Connaissance des Temps* for 1846, M. Biot has given a translation of Ma-touan-lin's catalogue of *Extraordinary Stars* observed in China. Amongst these I find,—

B.C. 134 in July. A strange star in the asterism formed by β, π, ϱ, *&c. Scorpii.*
48 in May. A star 4° distant from μ *Sagittarii.*
A.D. 123 in December. In the region about α *Herculis* and α *Ophiuchi.*
173 December 10. Between α and β *Canis Minoris*, presenting "the five colours," and remaining visible until July 174.

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* This work has already appeared under the title, "On the expected Return of the Great Comet of 1264 and 1556." By J. R. Hind, 8vo. pp. 78. London, G. Hoby, 123 Mount Street, Berkeley Square. The ephemerides on the hypothesis of different times of perihelion passage are contained in pp. 62–67.

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369 March to August.
386 April to July, in *Nan-teou* (λ, μ, φ, &c. *Sagittarii*). Remained there during the whole period.
393 March to October in the sidereal division *Ouei* (commencing at $\mu^2$ *Scorpii* and extending 18° in right ascension): declination indeterminate.
1011 February 8. A strange star seen near the square of *Nan-teou* (σ, τ, ζ, φ *Sagittarii*). This is probably the object referred by Hepidannus to the year 1012, which was of extraordinary brilliancy, remaining visible in the southern parts of the heavens during three months.
1203 July 28. A star appeared under the sidereal division *Ouei* (∴ right ascension was greater than that of $\mu^2$ *Scorpii*, but did not exceed it more than 18°): declination indeterminate.
1584 July 1. A strange star in the division *Fang* (∴ right ascension greater than that of π *Scorpii*, but not exceeding it more than 5°.

"I mention these stars because they appeared in the neighbourhood of the milky way, and therefore bear out the inference in your note, as to the general locality of "irregular stars." By far the greater number of the objects mentioned in Ma-touan-lin's catalogue of *Extraordinary Stars* were certainly comets, as is evident from their motion, but not appearing with trains, did not strictly come under the Chinese definition of a comet. The cases of new stars remote from the *via lactea* in this catalogue, are *very few indeed*. I never noticed this circumstance before.

"My measures of differences of right ascension and declination between the new star and Weisse xvi. 956, do not indicate any change of position.

| | Sidereal Time. h m | s | ′ ″ |
|---|---|---|---|
| April 27, at | 16 36 | $\Delta\alpha = +14{\cdot}89$ | $\Delta\delta = +18\ 22{\cdot}8$ |
| 28, | 15 55 | $= +14{\cdot}94$ | $= +18\ 21{\cdot}7$ |
| May 1, | 16 ± | $= +14{\cdot}8$ | not observed. |

"Professor Challis says his position, obtained on the night of the 28th, agrees exactly with mine for the previous night.

There are two small stars near the new one.

| | Pos. ° | Dist. ′ ″ |
|---|---|---|
| *a* 11th mag. | 249·4 | 7 54 |
| *b* 10·11 | 144·5 | 8 49 |

"I had intended to repeat the micrometric measures frequently with all possible accuracy, *i.e.* supposing the star does not vanish as suddenly as it has become visible.

"Mr. Woolgar remarks 'that this particular spot must have often been examined by astronomers during the last and early part of the present century, it being within a few minutes of the site assigned to the spurious star 52 *Serpentis* * * Mr. Baily alleges that its introduction arose from a mistake in the determining star (η *Herculis* for η *Ophiuchi*).'"

"Dr. Petersen, at Altona, 'first observed the new star on April 30, and estimated it of the 6th magnitude. On May 4 he set it down as 5·6. It was carefully compared with ν *Serpentis* on May 7, and was found to be a little smaller than that star. On May 11

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it was considerably fainter than ν *Serpentis* and *Piazzi* xvii. 191, and a little brighter than a star of about the 6th magnitude, the apparent place of which was observed to be,—

| | h m s | | ° ′ ″ |
|---|---|---|---|
| R.A. | 17 1 26·19 | Decl. | −10 19 6·9 |

"It has a very intense reddish-yellow light, and sometimes it appears to me that the red light becomes suddenly stronger, and as suddenly vanishes altogether.

"The apparent places of the changing star are,—

| 1848. | R.A.<br>h m s | Decl.<br>° ′ ″ | Mag. |
|---|---|---|---|
| April 30 | 16 51 1·23 | −12 39 17·0 | 6 |
| May 4 | 1·24 | 13·8 | 5½ |
| 7 | 1·42 | 13·8 | 5¼ |
| 11 | 16 51 1·50 | −12 39 14·7 | 5¾ |

Mr. Rümker remarks "that he does not know whether it is an optical illusion, but more rays appear to issue from it, in his opinion, than from other stars.

"Mr. Graham says,—'Your star is a most curious object. We observed it with the meridian circle on the 5th. I suppose your remark had some influence on my imagination, for it seemed to me in the large equatoreal to give symptoms of a disc.'"

*From a communication* by Mr. Hind *to the Society dated May* 29.

"It appears that on many of our globes, and on some charts, a star, called 52 *Serpentis*, is inserted nearly in the position of the new one. 52 *Serpentis* is one of the stars which Mr. Baily has notified as having been introduced into the *British Catalogue*, through an error of calculation on the part of Flamsteed, who, Mr. Baily remarks, has employed the right ascension of η *Herculis* as a determining point, instead of that of η *Ophiuchi.* The position assigned to 52 *Serpentis*, reduced to 1848, does not exactly agree with that of the New Star; still, assuming that such a star had really been observed by Flamsteed, the differences might have originated in a great proper motion, and it therefore became a matter of importance to ascertain the precise nature of the error committed by Flamsteed, whether under any circumstances 52 *Serpentis* could have existed.

We find for 1848,0,

| | R.A.<br>h m s | N.P.D.<br>° ′ ″ |
|---|---|---|
| 52 Serpentis ...... | 16 52 34·8 | 102 45 58 |
| Nova ............... | 16 50 59·1 | 102 39 16 |

"Through the kindness of the Astronomer Royal I have been favoured with a view of the original calculations, &c., preserved at the Royal Observatory, Greenwich. To ascertain the right ascension of an unknown object, Flamsteed's plan was to refer it to that of some well-determined star, observed on the same day. On

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1690, June 16, four stars were observed on the meridian, the first being certainly η *Ophiuchi* (as Flamsteed calls it), and not η *Herculis*, which is shewn by the zenith distances read off from the instrument. This is used by Flamsteed as a determining star for the other three, which were really ν, ξ, and ο *Serpentis*, as the observed zenith distances, and, the transits referred to η *Ophiuchi* undoubtedly prove. In fact, reducing the positions of the four stars to 1690, we find,—

| | | N.P.D. |
|---|---|---|
| | m s | ° ′ |
| η Ophiuchi........................ | | 105 17·6 |
| ν Serpentis follows η Ophiuchi | 10 47·1 | 102 29·6 |
| ξ .................................. | 27 13·3 | 105 9·6 |
| ο .................................. | 31 22·8 | 102 40·0 |

" The observed intervals and north polar distances were,

| | Interval. | Observed N.P.D. to nearest minute. |
|---|---|---|
| | m s | ° ′ |
| η Ophiuchi............... | | 105 17 |
| First Star (ν Serp.) after η Oph.... | 10 47 | 102 29 |
| Second Star (ξ Serp.) — ... | 27 39 | 105 9 |
| Third Star (ο Serp.) — ... | 31 23 | 102 39 |

" There appears to be some error in the observation of right ascension of ξ *Serpentis*, or in the reduction, amounting to $25^s$.

Flamsteed has taken for the right ascension of η *Ophiuchi* the 'determining star' of 1690, June 16, $16^h\ 32^m\ 58^s$, and hence finds,—

| | R.A. | N.P.D. |
|---|---|---|
| | h s m | ° ′ |
| First Star | 16 43 45 | 102 29 |
| Second Star | 17 0 37 | 105 9 |
| Third Star | 17 4 21 | 102 39 |

" The *first* is the spurious star 52 *Serpentis*, and the *third* another spurious star, 54 of the same constellation ; but it is singular that no use whatever has been made of the *second* observation by Flamsteed, otherwise, instead of two we should have three stars introduced into the catalogue, none of which are found in the heavens.

"The right ascension adopted as a determining point, $16^h\ 32^m\ 58^s$, is not exactly that of η *Herculis*, which would in 1690=$16^h\ 32^m\ 18^s$. Probably, therefore, all this confusion has arisen from some error of copy. In the present case it is extremely satisfactory to be able to refer to the original calculations, and shew from them that no such star as 52 *Serpentis* ever did exist. It is a practical proof of the almost imperative necessity of preserving *original* observations, notwithstanding the observer himself may fancy he has guarded against all possible sources of error in his published results.

" 52 and 54 *Serpentis* should therefore be omitted in all charts and globes."